



dovetail
GAMES

DB Regio BR 442 'Talent 2'



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1 Background

1.1 Multiple Unit

The BR 442 Talent 2 is a multiple unit built by Bombardier. Deutsche Bahn ordered 325 of 397 manufactured; 72 being ordered by other companies. They entered service with DB in 2011 and are the successor to the original Talent. The units have acquired the nickname "Hamsterbacke" (Hamster Cheeks).

The units run in many different areas of the German rail network, and on the Munich to Garmisch-Partenkirchen route they operate in four vehicle sets, occasionally running in a 4+4 configuration.

Design & Specification

Builder	Bombardier Transportation
Vehicle Length	40,100mm (two car unit)
Vehicle Width	2925mm
Drive	Electric
Acceleration	1.1m/s ²
Top Speed	160km/h (100 MPH)
Brake Types	Dynamic and air
Current	15 kV/16.7 Hz

2 Rolling Stock

2.1 DB Regio BR 442



3 Driving the BR 442

3.1 Cab Controls



- | | | | |
|---|-----------------------------|----|------------------------------------|
| 1 | Combined Throttle and Brake | 10 | Speed Control Activate/Deactivate* |
| 2 | Reverser | 11 | Speed Control Speed Set* |
| 3 | Train Brake | 16 | Apply Handbrake |
| 4 | Horns | 17 | Release Handbrake |
| 5 | Wipers | | |
| 6 | Headlights | | |
| 7 | Sanders | 12 | PZB Override** |
| 8 | Cabin Lights | 13 | PZB Release** |
| 9 | Pantograph | 14 | PZB Acknowledge** |



*See Section 4 – Automatic Speed Control

**See Section 6 – PZB Signalling System



- 3 Train Brake
- 4 Horns
- 5 Wipers
- 15 Instrument Lights

3.2 Keyboard Controls

Keys	Action
D A	Decrease or Increase combined throttle and brake
S W	Move reverser control backward or forward
{ } []	Decrease or Increase the train brake

3.3 General Keyboard Controls

Key(s)	Action
	Load/unload passengers
	Lights. Repeatedly pressing will cycle through headlight states where appropriate.
	Windscreen wipers. Press once to switch on and again to switch off.
	(Expert) Engine stop/start. By default engines will already be running at the start of a scenario. Press this button to stop and then again to restart the engine.
	(Expert) Sander. Causes sand to be laid on the rails next to the wheels to assist with adhesion. Press once to apply sand and again to stop.
	Horn.
	Handbrake on/off. This icon is displayed in the Coupling view
	Couple manually.

3.4 Additional Keyboard Controls

Destinations can be changed by pressing   and  

4 Automatic Speed Control

The Talent 2 is equipped with an automatic speed control which allows the driver to set the target speed. An on board computer will then apply the throttle to obtain that speed and maintain it through further applications of the throttle, or by applying braking when necessary. You can almost think of it as a kind of Cruise Control for trains.

To operate system, follow these steps:

Activate Speed Control.

Set the speed control to the desired value. In the speedometer a small blue triangle “bug” will slide around to the configured speed in steps of 5km/h.

Release the brakes.

Move the throttle control to the desired level of acceleration, at this point the train will begin moving and accelerate to the configured speed.

All speed changes should be managed with the automatic speed control, simply change the target speed as required and the computer will apply throttle and brakes appropriately.

Key	Function
	Activate/Deactivate
	Increase Speed Set
	Decrease Speed Set

5 PZB Signalling System

PZB stands for Punktförmige Zugbeeinflussung, loosely translated to English this means “Spotwise Train Control”.

Safe distances between trains are managed conventionally through the use of block-based signalling, whereby a given line is broken up in to a series of blocks and trains are permitted (via green or yellow) signals to enter a block. Once a train is present in a block the signal permitting entry is set to red, preventing any more trains entering.

As railways have developed, more complex control systems and in-cab signalling have been implemented to improve the safety of the railways, and to ensure that drivers are fully aware of what is happening around them by requiring them to take certain actions as each new situation develops.

PZB is a complex system and requires that you understand the varying speed limits and the requirement to respond promptly to the signalling system.

5.1 PZB Track Interface

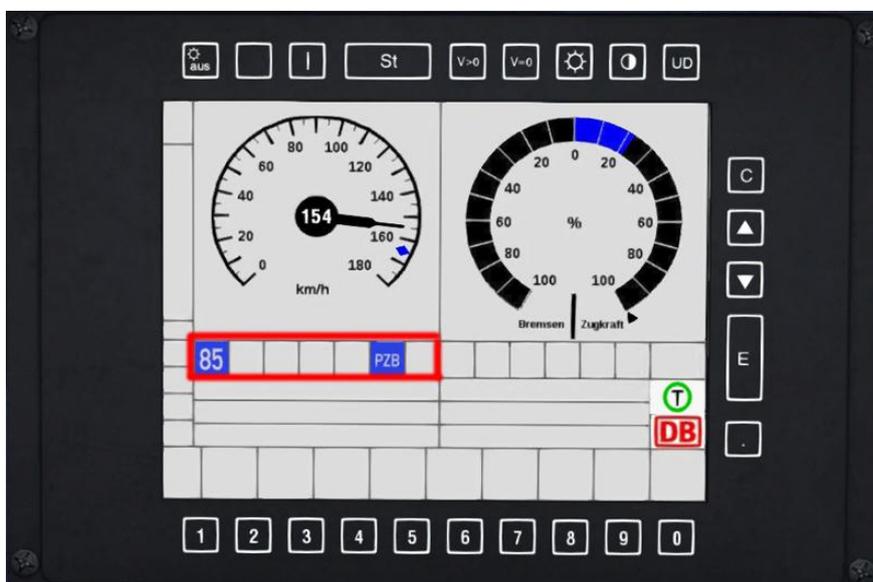


The PZB system incorporates in-cab signalling, where the control desk has indicators, alarms and buttons that will react according to the signalling status on the railway.

The mechanism by which this works is a series of “balise” magnets placed on the side of the track as shown above which are detected by the passing train.

5.2 In-Cab Indicators

Below the speedometer is an LCD display which lets the driver know the state of the PZB system:



5.3 Cab Controls

There are three controls on the far left of the cab desk which are used in order to interact with the PZB system.



PZB Befehl – PZB Override
 PZB Frei - PZB Release
 PZB Wachsam - PZB Acknowledge

5.4 Key Controls

Key(s)	Function
Ctrl (NumPad) Enter	Activate/Deactivate
Page Down	Acknowledge
End	Release
Delete	Override

5.5 Train Types

There are three PZB setups to accommodate three general train classifications by imposing different speed limits.

Type O (Obere)	Passenger trains
Type M (Mittlere)	Faster Freight Trains
Type U (Untere)	Slow / Heavy Freight Trains

The Talent 2 uses the Type O implementation of PZB, and when the system is active the LCD display will show the number 85 as seen above.

5.6 PZB Example



There are three primary points noted in the diagram above:

- A – The distant signal, placed around 1.2km from the hazard (such as a converging junction)
- B – Around 250m before the guarding signal
- C – The guarding signal; normally placed around 200m before the hazard.

Let's take a look at what happens in this simple example as you begin on the left hand side of the image above and progress along the track until you get to the guarding signal on the right.

We'll assume that in this case there is a converging junction set against us and therefore the guarding signal is at a stop indication.



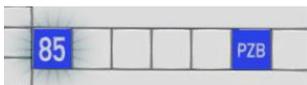
As you approach point A, the Distant Signal will show a Yellow indication to let you know that the signal it is reflecting (at C) is at red indicating danger.

You will also notice that there is a magnet next to this signal. This is called a 1000hz magnet.

As the signal is not showing a green aspect the magnet will be energised and the PZB system on-board the train will sense its presence.

As the train passes over the 1,000Hz magnet the driver has *up to 4 seconds* in which to press the PZB Acknowledge button.

If the driver fails to do this the PZB system will apply emergency brakes to stop the train.



When the 1,000Hz magnet has been passed an audible alert will sound and the '85' display will begin to blink.



Once the PZB Acknowledge button is pressed the audible alarm will cease, the '85' display continues to blink and the 1,000Hz display is shown, indicating that the train is now in a PZB monitored state.

A further 23 seconds are then allowed in which the train speed must be decreased to 85km/h. If after 23 seconds this speed is being exceeded then the PZB system will apply emergency braking.

Continuing onwards towards the guarded signal at no greater than 85km/h...

After 700 metres, PZB monitoring temporarily ceases and the 1,000Hz display will no longer be shown. Now the driver can make a decision based on the aspect shown by the upcoming signal.

If the signal is showing a red aspect the train needs to continue slowing down to stop.

If, however, the signal is now showing a clear aspect (because the hazard has cleared) the driver has the ability to fully release the train from monitoring by pressing the PZB Release button. As long as this is pressed before reaching Point B on the diagram the train will be permitted to return directly to line speed.

Caution:

Be careful to ensure that you only release PZB when the signal is clear. If you release and the signal is not clear, when you reach Point B the system will assume that you are incapable of safely driving the train and will apply emergency braking.

Assuming the signal is still at danger and that PZB monitoring has not been fully released a further track magnet will be encountered: this is the 500Hz magnet.

As the 500Hz magnet is passed the train speed must not exceed 65km/h or emergency braking will be applied.



At this point the 500Hz indicator will be displayed, although no acknowledgement of this is required.

After passing the 500Hz magnet the train speed must be reduced to under 45km/h within 153 metres to avoid an emergency brake application.

Even if the signal now changes to a clear aspect the 45km/h speed limit must still be adhered to, and it is not possible to use PZB Release whilst being monitored under a 500Hz restriction. Once the guarding signal (Point C) has been passed normal line speed may be resumed.

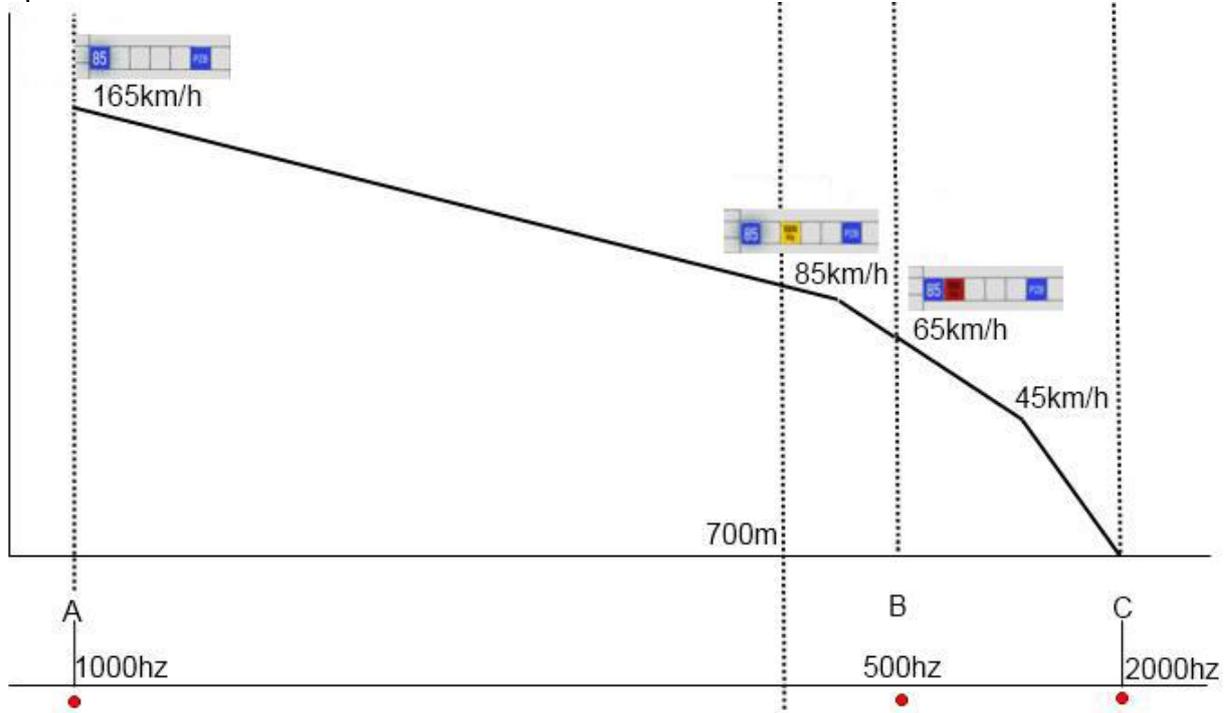
After stopping at a red signal the driver may request permission from the controller to pass it at danger. In order to pass the red signal the PZB Override button should be pressed.

At Point C the guarding signal has the third and final type of magnet, which is a 2,000Hz magnet. This magnet will *always* stop the train if passed and is used to stop trains that pass the signal while it is at danger.

Pressing and holding PZB Override button will stop the PZB system from reacting to the 2,000Hz magnet.

Example Run Graph

This is a graphical representation of the example, indicating the magnets, speed limits and the expected PZB indications.



6 SIFA

SIFA is short for Sicherheitsfahrschaltung or “Safety Driving Switch”.

The SIFA vigilance alerter is disabled at startup, but can be activated or deactivated by pressing ‘Shift+Enter(Numpad)’. While activated the SIFA light on the cab dashboard is normally switched off. While the train is moving the driver is required to confirm an alarm every 30 seconds.

When the 30 second alarm is triggered the SIFA light on the cab dashboard will illuminate, and after an additional 4 seconds an audible alert will sound.

After a further 2.5 seconds the emergency brake will be applied. This can be avoided by acknowledging the alarm at any stage by pressing the ‘Enter(Numpad)’ key.

7 Scenarios

*****For driving tutorials, please visit the Academy from the main TS2015 menu screen*****

7.1 [BR442] Night Commuter to Munich

Description:

Drive a night commuter train from Weilheim (Oberbay) to Munich.

Briefing:

Hi driver, this will be a routine passenger run from Weilheim (Oberbay) to Munich.

Durations:

40 Minutes

7.2 [BR442] Rush to Garmisch

Description:

A rush hour passenger run compounded by bad weather.

Briefing:

This is a morning passenger run during rush hour. Bad weather and poor visibility compound to make an already tight deadline more difficult.

Duration:

45 minutes

7.3 [BR442] A Day of Talent

Description:

You will be starting just outside of Garmisch–Partenkirchen and are due to drive a passenger service as far as Murnau.

Briefing:

Start by picking up passengers at Garmisch–Partenkirchen. Then take your passenger service to Murnau making stops at all stations on the way.

Duration:

30 minutes

8 Acknowledgements

Dovetail Games would like to thank the following people for their contribution to the development of the DB Regio BR 442-2.

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